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Teach yourself how to build a Business Case for any industry

incl mining

2f Step 3: Uncertainty, Risk and Optionality

Spend only a few seconds/minutes on each page

This website contains opinions.
It may have errors so always check your own work and have it audited by a competent person

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Inside Level 2 there usually are five steps …

Level 3: Decision making

Level 2: Evaluating the business/project

Level 1: Hands-on business modelling

Continuing through Step 3 →

- Step 1: Decide which business entity is to be evaluated
- Step 2: Create the hands-on model
- **Step 3: Compute the basket of powerful economic measures:** NPV, IRR, Payback, cash break even, key drivers, dollar trees, four cash streams, **uncertainty, risk, optionality**
- Step 4: Assess alternatives, flexibility, options, risks, the business, the industry

Step 5: Interact so the decision makers "have their eyes wide open"

In simple terms, I understand that …


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Uncertainty

Is by how much experts forecast that a parameter might vary.

As an illustration they may estimate:

Maximum price = $2.50

High price = $2.10

Mid price = $1.75

Low price = $1.20

Minimum price = $0.95

The key role of uncertainty is discussed in the module on NPV and IRR, etc

Risk

Is whether an event may happen or not happen.

As an illustration there is a 75% likelihood of getting the environmental approvals

And so a 25% risk of not getting the environmental approval to proceed.

Optionality

If one thing happens then another thing may or may not follow

If we build the first factory then its infrastructure means that we should have an 70% likelihood of being able to build the second factory alongside.

Uncertainty, Risk and Optionality are likely to be absolutely essential concepts in understanding and computing the full range of values of a business/project.

As an illustration you may compute the following sets of valuations: -

- minimum, low, mid, high, maximum
- a probability weighted valuation of minimum, low, mid, high, maximum
- values adjusted for uncertainty - minimum, low, mid, high, maximum
- values adjusted for risk (positive and negative)
- values adjusted for optionality (positive and negative)
- where valid, values generated from probabilistic software

Everyone should be aware of

1. all results and of
2. the assumptions (opinions) underlying each

Decisions must be made with eyes wide open!

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In these three areas there are many people specialising in running workshops, doing computations and co-ordinating to a result.

As everywhere some consultants are good and some are mediocre, some are reasonably priced and some are overpriced, some are great at self promotion and some are modest.

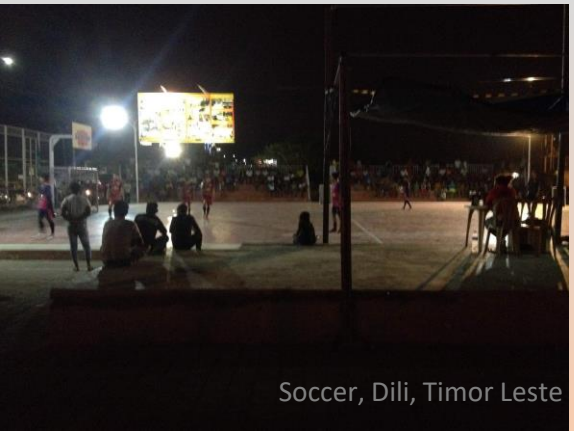
Paying lots for a self confident showman may not be as beneficial as hiring a modest, competent, hard worker.

I feel a lot of this sort of work can be done in-house by the business/project team or by an in-house colleague once they get understanding of what is required.

Watch out for a workshop co-ordinator who inadvertently starts leading the discussion. This person should facilitate, perhaps get people to stretch their thinking but never help set values for uncertainty, risk or optionality. Can be difficult.

I believe results only if I truly understand how they were generated and if I understand the key assumptions upon which they are based.

I no longer feel intimidated by mathematicians and seasoned 'experts' who expect me to accept their results at face value. Their job is to convince me!



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My mantra for evaluation is

"If you don't easily understand my work then you don't have a problem: I do!"

Remind everyone that evaluation results, no matter how sophisticated the method, are only opinions expressed mathematically

Just like NPV, IRR, … etc all the results of work in uncertainty, risk and optionality are nothing more than assemblies of expert opinions. Any results are only as valid and trustworthy as the data going in and of the processing mathematics.

Be wary of managers and colleagues who start thinking the results are true and objective.

Be more aware of probabilistic software dealers who smooth over the limitations of the interactions between key parameters like price/ forex/ cut-off grade/ throughput/ capex/etc.

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Risk & Optionality

Research methods for risks and for optionality from the Internet.

Methodologies are well described in many publications and sources on the Internet.

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One common way to handle risks and optionality seems to be via separate decision trees.

This might involve working from your base case NPV/IRR (mid case or probability weighted) and adding the first prime risk. As an illustration there may be a 25% likelihood that community groups will prevent your project from proceeding after you have spent cash on studies and government processes. Multiply the NPV of these lost costs by 25%, and the base case NPV by 75%. Repeat across a decision tree.

Do similarly for optionality – as an illustration if we build the factory then we estimate there is a 70% likelihood of being able to justify a second factory alongside which would create an extra $45 million NPV. 70% * $45m = $34m.

Your job is to actively research ways to exploit risk and optionality to create a better business.

Risk & Optionality – Unlocking Hidden Value

Flowing out of risk and optionality there is a tiny, growing industry that claims to unlock ‘hidden value’.

This is fine if the project was healthy anyway and optionality recognises extra ways of reaping value over its life.

But if your project needs ‘hidden value’ to get over the line, then warning bells should start ringing. My first reaction is that if a business/project cannot be justified by normal NPV computations and needs ‘hidden value’ to be unlocked by mathematics to reach a satisfactory NPV then I have big reservations. (I worked alongside a mega project that kept itself alive for years with this hope, only to fall over when senior management was changed out and reality ruled.)

Despite this I would keep an open mind, look for its positive opportunities and would go through the computations. Again I would add it to the assembly of NPVs and if the computation method seemed sound then give it appropriate weighting.

I have worked alongside:

1. **A uncertainty expert** who led/steered a project team through an extensive series of uncertainty workshops to conclude that our major project had a 98% likelihood of positive NPV. It was constructed and it was a disaster.

2. **A humble but very bright guy** who was advising the company on discount rate theory, optionality and probabilistic evaluation - all whilst doing his normal job. He could explain and discuss each of these very challenging areas in easy-to-understand terms. Never were the underlying theories too hard for the common man to grasp and he was never 'trust me' because the mathematics are too complex.

   He towers above everyone else in his ability to explain in easy-to-follow concepts the inputs, mathematics and outputs of discount rate theory, optionality and probabilistic evaluation. He was exceptional in his ability to make me feel confident in understanding the results and the limitations of the results.

Yes, economic evaluation is a lot, lot more than pumping out NPV's & IRR's.
Each project/investment/opportunity should be understood against:

- **A basket of economic measures.**
- **Its ability to flex and adapt to a wide range of business and operating conditions.**
- **Its uncertainties, risks, rewards, optionality.**
- **Its strengths and weaknesses**
- **Its fit inside your company.**
- **Its direct and indirect competitors,**

and most importantly

- **the future for that industry**

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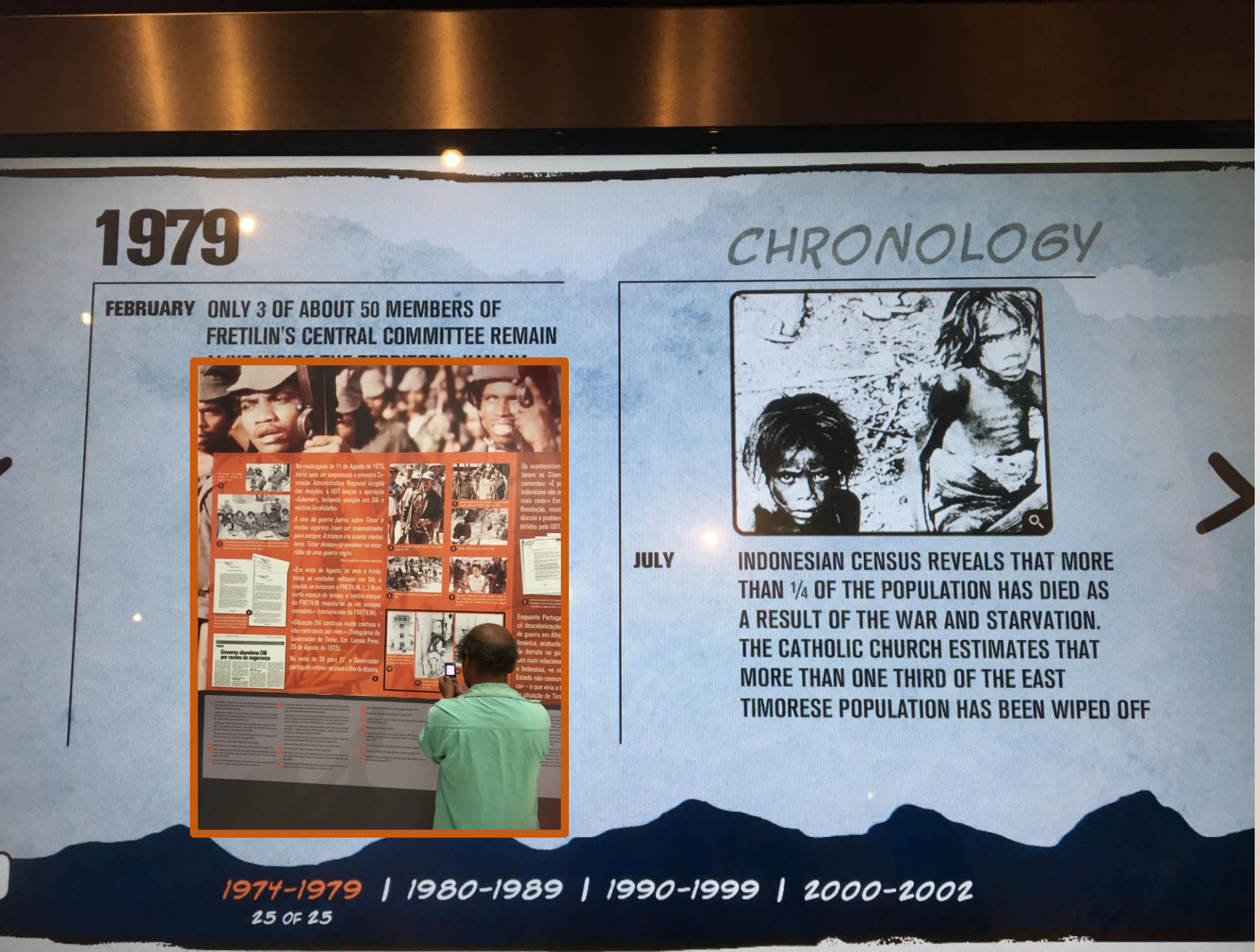

End of Module